

Paper No. 40

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JU-NAN KAO, JOHN K. HOWIE, PATRICK J. CORRIGAN,
RICHARD G. SCHAFERMEYER, KATHERINE E. FLYNN,
NELSON J. HOLZSCHUH and DAVID J. BRUND, JR.

Appeal No. 96-3169
Application No. 08/271,273

HEARD: NOVEMBER 30, 2000

Before Owens, Lieberman and Timm, Administrative Patent Judges.

Lieberman, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 1 through 4, 7, 9, 11, and 13 through 23 which are all the claims pending in this application.

THE INVENTION

The invention is directed to a two stage transesterification process for preparing highly esterified polyol fatty acid polyesters wherein the second stage of

the reaction occurs under conditions that result in a combined level of difatty ketones and β -ketoesters of 300 ppm or less. The second stage reaction conditions include controlling the amount of an easily removable alcohol formed as a byproduct of the transesterification reaction, a specific temperature and pressure range, a specific mole ratio and sparging with an inert gas.

THE CLAIMS

Claim 1 is illustrative of appellants' invention and is reproduced below.

1. In a solvent-free, two-stage transesterification process for preparing highly esterified polyol fatty acid polyesters from a polyol and fatty acid esters of an easily removable alcohol, wherein said first stage comprises forming polyol fatty acid partial esters from a reaction mixture containing a polyol having at least 4 esterifiable hydroxy groups and the fatty acid esters of the easily removable alcohol in the presence of an effective amount of a basic catalyst and optionally an effective amount of soap emulsifier, and wherein said second stage comprises forming highly esterified polyol fatty acid polyesters from a reaction mixture containing the polyol fatty acid partial esters, fatty acid esters of the easily removable alcohol and an effective amount of a basic catalyst, the improvement which comprises carrying out said second stage under reaction conditions that provide a combined level of difatty ketones and β -ketoesters of about 300 ppm or less in the resulting highly esterified polyol fatty acid polyesters, and that result in at least about 96% of the hydroxy groups of the polyol being esterified, said reaction conditions including:

- (a) controlling the level of easily removable alcohol in the liquid phase of the second stage reaction mixture to from about 10 to about 150 ppm; and
- (b) heating the second stage reaction mixture to temperatures in the range of from about 79.4°C to about 135°C and a pressure of from about 15 to about 100 mm Hg; and
- (c) sparging with an inert gas; and
- (d) keeping the molar ratio of fatty acid esters of easily removable alcohols to each esterifiable hydroxy group of the polyol in the range of from about 0.91 to about 1.4:1.

THE REFERENCE OF RECORD

As evidence of obviousness, the examiner relies upon the following references.

Willemse	4,973,682	Nov. 27, 1990
Volpenhein	4,518,772	May. 21, 1985

THE REJECTIONS

Claims 1 through 4, 7, 9, 11, and 13 through 23 stand rejected under 35 U.S.C. § 103 as being unpatentable over Willemse.

Claims 1 through 4, 7, 9, 11, and 13 through 23 stand rejected under 35 U.S.C. § 103 as being unpatentable over Volpenhein.

OPINION

We have carefully considered all of the arguments advanced by appellants and the examiner and agree with the appellants that the aforementioned rejections of claims 1 through 4, 7, 9, 11, and 13 through 23 are not well founded. Accordingly, we do not sustain these rejections.

The Rejections under § 103.

"[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a ***prima facie*** case of unpatentability," whether on the grounds of anticipation or obviousness. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). On the record before us, there are two rejections over Willemse and Volpenhein respectively. The examiner's position is essentially the same with respect to each rejection. The examiner admits that the claimed subject matter differs from the prior art in the recitation of "providing a

combined level of difatty ketones and β -keto esters of about 300 ppm or less." See Answer, pages 4 and 6. It is submitted, however, that it would have been obvious to one of ordinary skill in the art to obtain the level of difatty ketones and β -keto esters in the claimed process as the reaction conditions are closely related and an analogous product is obtained therefrom. See Answer, pages 4 through 6. We disagree.

Appellants have stated in their specification that, "[t]he improvement in this two stage transesterification process according to the present invention involves carrying out the second stage under reaction conditions that provide a combined level of difatty ketones and β -diketoesters of about 300 ppm or less in the resulting highly esterified polyol fatty acid polyesters, after any residual fatty acid esters, basic catalyst and soap emulsifier have been removed. These reaction conditions involve a combination of at least the following:

(a) controlling the level of easily removable alcohol in the liquid phase of the second stage reaction to from 10 to about 100 ppm; and
(b) heating the second stage reaction mixture to temperatures in the range of from about 175° to about 275°F (from about 79.4° to about 135°C)." See specification page 7, lines 4-18. In addition to the above requisite condition the specification further discloses additional reaction conditions including steps (c) and (d) of the claimed subject matter.

In comparing these conditions with those of the references of record, we find that Willemse discloses a similar solvent free transesterification reaction conducted

at elevated temperature and reduced pressure. See column 1, lines 5-14. We find that a temperature range of 100° to 180°C is disclosed for each stage of the transesterification reaction. See column 3, lines 50-52. We find that the pressure can be reduced to less than 25 mbar during the final stage of the reaction “preferably during the final stage (2) even lower pressures are applied, in particular of less than 10 mbar and most preferably less than 5 mbar.” See column 3, lines 40-42. We find that 25 mbar corresponds to 18.75 mm Hg, that 10 mbar corresponds to 7.5 mm Hg, and that 5 mbar corresponds to 3.75 mm Hg.

As to the mole ratios, we find that the requisite mole ratio is disclosed in column 4, lines 38-41. We do not find, however, any disclosure of sparging with an inert gas during the second stage of the reaction.

We find that Volpenheim discloses a solvent free transesterification process for synthesizing higher polyol fatty acid polyesters. See column 2, lines 41-43. We find that the second step of the process requires a temperature range of 120° C to 160° C and a pressure of from about 0.1 mm Hg to about 10 mm Hg. See column 5, lines 36-39. We find that Volpenheim further discloses the use of various techniques, “to effectively and efficiently remove the lower alcohol.” See column 5, lines 48-49. We find that patentee discloses that, “sparging has been found to promote the reaction.” See column 5, line 51. We further find that the mole ratio of fatty acid esters to polyol is above about 8:1. See column 5, lines 28-30. This corresponds to ratios falling within that of (d) of the claimed subject matter.

In our view, since the combined level of difatty ketones and β -ketoesters of about 300 ppm is a derived value dependent on the reaction conditions required by the claimed subject matter, the references of record must disclose that each of the conditions (a) through (d) are necessarily present in order to obtain the requisite combined level of difatty ketones and β -ketoesters. However, Willemse discloses pressures which are preferably lower than those required by the claimed subject matter and temperatures which may be substantially higher than those of the claimed subject matter. Moreover, Willemse does not disclose sparging with an inert gas in the second stage of the reaction as required by the claimed subject matter.

As to Volpenhein, the maximum pressure disclosed for the second stage is less than the minimum pressure required by the claimed subject matter. The temperature range overlaps that required by the claimed subject matter and it cannot be found that the amount of easily removable alcohol is necessarily within the range required by the claimed subject matter.

Based upon the above findings and analysis, we determine that none of the references taken alone or together suggest or teach all of the claimed procedural limitations, let alone the combined level of difatty ketones and β -diketoesters of about 300 ppm or less of the claimed subject matter. Although the requisite level of ketone and ester may inherently be present, provided that all other limitations are also present, inherency requires that the characteristic must necessarily be present. It may not be established by probabilities or possibilities. Hence, the mere possibility

that each of the process conditions required by the claimed subject matter may be present in the disclosure of Willemse or

Volpenhein is not sufficient to establish inherency. See In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); Ex parte Skinner, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986). Furthermore, the examiner must provide some evidence or scientific reasoning that the presence of the "combined level of difatty ketones and \$-ketoesters of about 300 ppm or less" characteristic is an inherent characteristic of the prior art compositions. In the case before us, no such evidence or reasoning has been set forth. Accordingly, the rejection of the examiner is reversed.

Because we reverse on this basis, we need not reach the issue of the sufficiency of the showing of unexpected results. In re Geiger, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987).

DECISION

The rejection of claims 1 through 4, 7, 9, 11, and 13 through 23 under 35 U.S.C. § 103 as being unpatentable over Willemse is reversed.

The rejection of claims 1 through 4, 7, 9, 11, and 13 through 23 under 35 U.S.C. § 103 as being unpatentable over Volpenhein is reversed.

The decision of the Examiner is reversed.

REVERSED

TERRY J. OWENS
Administrative Patent Judge

PAUL LIEBERMAN
Administrative Patent Judge

CATHERINE TIMM
Administrative Patent Judge

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Appeal No. 1996-3169
Application No. 08/271,273

APJ LIEBERMAN

APJ TIMMS

APJ OWENS

DECISION: REVERSED
Send Reference(s): Yes No
or Translation (s)
Panel Change: Yes No
Index Sheet: 2901 Rejection(s):
Prepared: December 20, 2001

Draft Final

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PALM / ACTS 2 / BOOK
DISK (FOIA) / REPORT